Port of Port Townsend

2019 BREAKWATER REPAIR PROJECT
at
BOAT HAVEN MARINA
PORT TOWNSEND, WASHINGTON

BIDDING & CONTRACT DOCUMENTS

Prepared by:

Harold T Andersen, PE
Quadra Engineering, SP
PO Box 2094
1630 Walnut Street
Port Townsend, WA 98368
360 379-9117
360 460-7311 cell
htandersen@q.com

July 3, 2019

[Signature]
BIDDING & CONTRACT DOCUMENTS

INVITATION TO BID ................................................................. 2 pages

BID PROPOSAL & BID FORM ............................................. 2 pages

BIDDERS’ INFORMATION ..................................................... 3 pages

AGREEMENT ........................................................................... 3 pages

LABOR & MATERIALS ............................................................. 3 pages

PAYMENT BOND

PERFORMANCE BOND ............................................................ 3 pages

SPECIAL PROVISIONS .............................................................. 4 pages

DRAWINGS .............................................................................. 2 pages
INVITATION TO BID
2019 BREAKWATER REPAIR PROJECT
BOAT HAVEN MARINA

Sealed bids will be received by the Port of Port Townsend, PO Box 1180, 2701 Jefferson Street, Port Townsend, WA 98368 up to but no later than 2:00 PM, Wednesday, September 18, 2019; for the 2019 Breakwater Repair Project.

The work includes:
Placing rock to repair the south face of the Boat Haven Breakwater.
Approximate quantities follow:

- Excavate & Spread Sand .......... 120 CY
- Geotextile ............................ 620 SY
- Permeable Ballast ................. 64 TON
- Quarry Spalls ......................... 225 TON
- 3 Man Rock ............................. 480 TON
- 4 & 5 Man Rock ...................... 735 TON
- Revegetate Top of Breakwater .... 6000 SF

Questions should be directed to:
Harold T Andersen, PE
Quadra Engineering, SP
PO Box 2094
1630 Walnut Street
Port Townsend, WA 98368
360 379-9117
360 460-7311 cell
htandersen@q.com

Bidders may request a site visit prior to bid opening by contacting Harold Andersen.

Bids shall be submitted in a sealed envelope or by email to:
Karen Erickson
Executive Assistant
Port of Townsend
PO Box 1180 (US Mail)
2701 Jefferson Street (ground deliveries)
Port Townsend, WA 98368
385-0656/2323
karen@portofpt.com
Bidder will enter into an Agreement within five (5) days after receipt of notification of intent to award. Bidders shall not withdraw their bid after the bid opening, or before award of the contract, unless award is delayed for more than forty-five (45) days.

The contract will be awarded to the lowest responsible bidder. The Port of Port Townsend reserves the right to reject any and all bids and to waive any informalities or irregularities in the bidding, and to accept the bid deemed best for the Corporation.

A Labor and Materials Payment Bond and a Performance Bond will be required. A bid bond is not required.
BID PROPOSAL & BID FORM
2019 BREAKWATER REPAIR PROJECT
BOAT HAVEN MARINA

BID PROPOSAL
1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with the Port of Port Townsend, in the form included in the Contract Documents, to perform the work as specified or indicated in Contract Documents entitled Commercial Basin Breakwater Repair Project.

2. Bidder accepts all the terms and conditions of the Contract Documents, including without limitation those in the Invitation to Bid and Bidders’ Information.

3. This Bid will remain open for the period stated in the Invitation to Bid unless otherwise required by law. Bidder will enter into an Agreement within the time and in the manner required in the Invitation to Bid, and will furnish the insurance certificates, Payment Bond, and Performance Bond required by the Contract Documents.

4. Bidder has examined copies of all Contract Documents including the following addenda (receipt of all of which is hereby acknowledged):

<table>
<thead>
<tr>
<th>Number</th>
<th>Date</th>
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5. Bidder has familiarized itself with the nature and extent of the Contract Documents, work, site, locality where the work is to be performed, legal requirements (federal, state and local laws, ordinances, rules and regulations), and the conditions affecting cost, progress or performance of the work and has made such independent investigations as Bidder deems necessary.

6. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or corporation to refrain from
bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over the Port of Port Townsend.

7. Bidder agrees not to withdraw the bid for a period of thirty (30) calendar days after the bid opening date.

**BID FORM**

Mobilization Bid Amount $ ________________________ Lump Sum

Lump Sum Bid Amount for Work Described on Project Drawings

$ ________________________ Lump Sum

**TOTAL PROJECT BID** $ ________________________ Lump Sum

(including Washington State Sales Tax)

Bidder further agrees to complete the work required under the Contract Documents within the Contract Time stipulated and to accept in full payment the Total Project Bid Price submitted herewith.

Dated: __________________________ Bidder: __________________________

By: __________________________

Title: __________________________

A Proposal Guaranty (Bid Bond) is not required.
BIDDERS’ INFORMATION
2019 BREAKWATER REPAIR PROJECT
BOAT HAVEN MARINA

PROPOSED SUBCONTRACTORS:

The following is a complete list of Subcontractors that will be used on the work if the Bidder is awarded the Contract. This information shall be provided to the Owner within three days of the bid opening.

<table>
<thead>
<tr>
<th>Work to Be Performed</th>
<th>Proposed Subcontractor</th>
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ADDENDA RECEIVED

The Bidder hereby acknowledges receipt of Addenda issued for this project.

<table>
<thead>
<tr>
<th>Addendum No.</th>
<th>Date Received</th>
<th>Name of Recipient</th>
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</table>

TIME FOR COMPLETION

Subject to delays granted due to conditions entitling the Contractor to an extension of time under the Contract Documents, the undersigned agrees to complete all work under this Contract within thirty (30) calendar days beginning with the tenth calendar day after the date of written notice to proceed with the work.

PORT OF PORT TOWNSEND
2019 BREAKWATER REPAIR PROJECT
BIDDERS’ INFORMATION
Page 1 of 3
BIDDER'S GENERAL INFORMATION:

The Bidder shall furnish the following information. Additional sheets shall be attached as required. Failure to complete Items 1, 3, 5 and 8 shall cause the bid to be non-responsive and may cause its rejection. In any event, no award will be made until all of the Bidder's General Information (i.e., Items 1 through 8, inclusive) is delivered to the Owner.

(1) Contractor's name and address: ________________________________

(2) Contractor's telephone number: ________________________________

(3) Contractor's license: Primary classification: _______________________

State License Number and Expiration Date: __________________________

Supplemental classifications held, if any: ____________________________

Name of Licensee, if different from (1) above: ________________________

(4) Name of person who inspected site of proposed work from your firm:

Name(s): _______________________________________________________

Date(s) of Inspection: ___________________________________________

(5) Surety Company AM BEST rating:

(6) Attach to this bid the experience resume of the person who will be designated chief construction superintendent or on-site construction manager.

(7) Attach to this bid a financial statement, references, and other information, sufficiently comprehensive to permit an appraisal of Contractor's current financial condition.

(8) Attach to this bid a list of at least three construction contracts completed by the Contractor during the last five years involving work of similar type and comparable value. The list shall include the following information as a minimum:

PORT OF PORT TOWNSEND
2019 BREAKWATER REPAIR PROJECT
BIDDERS' INFORMATION
Page 2 of 3
Names, address and telephone number of owner.
Name of project.
Brief description of the work involved.
Contract amount.
Date of completion of contract.
Name, address and telephone number of architect or engineer.
Name of owner's project engineer.
AGREEMENT
2019 BREAKWATER REPAIR PROJECT
BOAT HAVEN MARINA

THIS AGREEMENT is dated this______day of _________ in the year 2019, by and between the Port of Port Townsend, PO Box 1180, 2701 Jefferson Street, Port Townsend, WA 98368; (hereinafter called Owner) and ___________________________ , hereinafter called Contractor.

Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1. WORK.

Work under this project is described by the Plans and these Contract Documents. This work includes

- Excavate & Spread Sand................. 120 CY
- Geotextile.................................. 620 SY
- Permeable Ballast ......................... 64 TON
- Quarry Spalls................................ 225 TON
- 3 Man Rock.................................. 480 TON
- 4 & 5 Man Rock......................... 735 TON
- Revegetate Top of Breakwater.... 6000 SF

ARTICLE 2. CONTRACT TIME.

Subject to delays granted due to conditions entitling the Contractor to an extension of time under the Contract Documents, the undersigned agrees to complete all work under this Contract within thirty (30) calendar days beginning with the tenth calendar day after the date of written notice to proceed with the work.
ARTICLE 3. CONTRACT PRICE

Owner shall pay Contractor for completion of the work in accordance with the amounts set forth in the Bid Schedule, including Washington State sales tax, as summarized below:

Total Agreement Amount $____________________
(page 2 Bid Proposal & Bid Form)

ARTICLE 4. PAYMENT PROCEDURES.

Contractor shall submit Applications for Payment in accordance with Section 1-09.9 of the WSDOT Standard Specifications.

ARTICLE 5. CONTRACT DOCUMENTS.

The Contract Documents which comprise the entire agreement between Owner and Contractor concerning the work consist of this Agreement and the following attachments to this Agreement:

Advertisement for Bids.

Bidders' Information

Bid Proposal including the Bid Schedules, Bidders' Information, and all required certificates and affidavits.

Performance and Payment Bonds.

Special Provisions

Drawings consisting of 2 pages

Addenda numbers ________ inclusive.

Change Orders which may be delivered or issued after Effective Date of the Agreement and are not attached hereto.
There are no Contract Documents other than those listed in this Article. The Contract Documents may only be amended by Change Order as provided for in Section 1-04.4 of the Standard Specifications.

ARTICLE 6. MISCELLANEOUS.

An assignment by a party hereto of any rights under or interests in the Contract Documents will not be binding on another party hereto without the written consent of the party sought to be bound; and specifically, but without limitation, monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, an assignment will not release or discharge the assignor from any duty or responsibility under the Contract Documents.

Owner and Contractor each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.

IN WITNESS WHEREOF, Owner and Contractor have caused this Agreement to be executed the day and year first above written.

OWNER:

By __________________________
   Jim Pivarnik
   Executive Director
   Port of Port Townsend

CONTRACTOR:

By __________________________

______________________________
License No
LABOR AND MATERIALS PAYMENT BOND

INFORMATION ONLY

The following form must be executed and submitted by the successful Bidder within ten (10) days following notice of award.
LABOR AND MATERIAL PAYMENT BOND

We ________________________________ as Principal, and
______________________________ as Surety, jointly and severally bind ourselves, our
heirs, successors and assigns as set forth herein to the Port of Port Townsend
(hereinafter called the Owner) for payment of the penal sum of
______________________________ Dollars ($ ___________), lawful money of the United
States in connection with the owner’s award to the Contractor of a contract for
construction of the following project:

Port of Townsend
2019 BREAKWATER REPAIR PROJECT
BOAT HAVEN MARINA

THE CONDITION OF THIS OBLIGATION IS SUCH that if the Contractor shall in all
respects faithfully perform all obligations and provisions in the said Contract, and pay all
laborers, mechanics, and subcontractors and materialmen, taxing authorizes and all
persons who supply such person or persons or subcontractors with material, equipment
and supplies for the carrying on of such work, this obligation shall become null and void;
otherwise, it shall remain in full force and effect, and Surety shall defend and indemnify
Port against any loss or damage due to the failure of the Principal to strictly perform all
obligations of the Contract.

This bond shall be in force until completion of the Project and acceptance by the Port,
and also for such period thereafter during which the law allows claims to be filed and
sued upon.

This bond is provided pursuant to and in compliance with RCW Chapter 39.08, the
terms and requirements of which statute are incorporated herein as though fully set
forth herein.

Surety agrees that no change, extension of time, modifications, or addition to the terms
of the Contract, or the work to be performed thereunder, or to the specifications shall in
any way affect its obligation on this bond, and it hereby waives notice thereof.

The Contractor and Surety agree that if the Port is required to engage the services of an
attorney in connection with the enforcement of this bond, each shall pay the Port
reasonable attorney’s fees incurred, with or without suit, in addition to the penal sum.
Surety certifies that it is an authorized surety bond issuer, properly authorized to transact surety business in Washington. Surety agrees to be bound by the laws of the State of Washington and subject itself to the jurisdiction of the courts of the State of Washington.

Executed in four original counterparts on ________________, 2019

CONTRACTOR: ____________________________
By: ______________________________________

Title: ______________________________________
(Attach acknowledgment of authorized representative of Contractor).

Any claims under this bond made in accordance with RCW 39.08 may be addressed to:

(Name and address of Surety) ____________________________

________________________________________

________________________________________

(Name and address of Surety’s agent for service of process in Washington if different from above)

________________________________________

________________________________________

(Telephone No. of Surety’s Washington agent): __________________________

(Attach acknowledgment)

Surety: ______________________________________

By: Its Attorney-in-Fact ______________________________________

Notice:

PORT OF PORT TOWNSEND
2019 BREAKWATER REPAIR PROJECT
LABOR AND MATERIALS PAYMENT BOND
Page 3 of 4
Sureties must be authorized to conduct surety business in Washington and have an agent for service of process in Washington. Certified copy of Power of Attorney must be attached.
PERFORMANCE BOND

INFORMATION ONLY

The following form must be executed and submitted by the successful bidder within ten (10) days following notice of award.
PERFORMANCE BOND

We __________________________ as Principal, and
________________________________ as Surety, jointly and severally bind
ourselves, our heirs, successors and assigns as set forth herein to the PORT OF PORT
TOWNSEND (hereinafter called the Owner) for payment of the penal sum of
________________________________ Dollars ($ __________) lawful money of the
United States in connection with the owner’s award to the Contractor of a contract for
construction of the following project:

Port of Townsend
2019 BREAKWATER REPAIR PROJECT
BOAT HAVEN MARINA

THE CONDITION OF THIS OBLIGATION IS SUCH that if the Contractor shall in all
respects faithfully perform all obligations and provisions in the said Contract, this
obligation shall become null and void; otherwise, it shall remain in full force and effect,
and Surety shall defend and indemnify Owner against any loss or damage due to the
failure of the Principal to strictly perform all obligations of the Contract.

This bond shall remain in force for a period of at least two (2) years after Substantial
Completion, with respect to defective workmanship and materials, and shall otherwise
secure all other obligations of the Contractor throughout any other periods of limitation.

This bond is provided pursuant to and in compliance with RCW Chapter 39.08, the
terms and requirements of which statute are incorporated herein as though fully set
forth herein.

Surety agrees that no change, extension of time, modification, or addition to the terms
of the Contract, or the work to be performed thereunder, or to the specifications shall in
any way affect its obligation on this bond, and it hereby waives notice thereof.

The Contractor and Surety agree that if the Owner is required to engage the services of
an attorney in connection with the enforcement of this bond, each shall pay the Owner
reasonable attorney’s fees incurred, with or without suit, in addition to the penal sum.

Surety certifies that it is an authorized surety bond issuer, properly authorized to
transact surety business in Washington. Surety agrees to be bound by the laws of the
State of Washington and subject itself to the jurisdiction of the courts of the State of
Washington.
Executed in four original counterparts on ______________________, 2019

CONTRACTOR: ____________________________________________

By: ______________________________________________________

Title: ____________________________________________________

(Attach acknowledgment of authorized representative of Contractor).

Any claims under this bond made in accordance with RCW 39.08 may be addressed to:
(Name and address of Surety) ____________________________________________

(Name and address of Surety's agent for service of process in Washington if different from above)

(Telephone No. of Surety's Washington agent) __________________________

(Attach acknowledgment)

Surety: _______________________________________________________

By: Its Attorney-in-Fact _________________________________________

Notice:
Sureties must be authorized to conduct surety business in Washington and have an agent for service of process in Washington. Certified copy of Power of Attorney must be attached.
SPECIAL PROVISIONS
2019 BREAKWATER REPAIR PROJECT
BOAT HAVEN MARINA

INTRODUCTION TO THE SPECIAL PROVISIONS
The work on this project shall be accomplished in accordance with the Standard Specifications for Road, Bridge and Municipal Construction, 2016 edition, as amended, issued by the Washington State Department of Transportation (WSDOT) and the American Public Works Association (APWA), Washington State Chapter (hereafter the "Standard Specifications").

The Standard Specifications, as modified or supplemented by these Special Provisions, shall govern all the work. The deletion, amendment, alteration, or addition to any subsection or portion of the Standard Specifications is meant to pertain only to that particular portion of the section, and in no way should be interpreted that the balance of the section does not apply.

In case of conflict between the various elements of the Contract Documents, refer to Section 1-04.2 of the Standard Specifications for order of precedence.

DESCRIPTION OF WORK
The work to be performed under this Contract consists of furnishing all materials, equipment, tools, labor, and other work or items incidental thereto; and performing all Work as shown on the Plans, required by the Contract, and in accordance with the Contract Documents, all of which are made a part hereof.

This project involves the following:
- Excavate & Spread Sand .......... 120 CY
- Geotextile ....................... 620 SY
- Permeable Ballast .............. 64 TON
- Quarry Spalls ................... 225 TON
- 3 Man Rock ...................... 480 TON
- 4 & 5 Man Rock ................. 735 TON
- Revegetate Top of Breakwater .... 6000 SF
NOTATION
These Special Provisions supplement, add new, replace, or modify the combined
Standard Specifications and Amendments. For clarification of the purpose of the
sections provided, these Special Provisions have the following added section
descriptors:

Supplement: Text supplements, slightly modifies, or adds clarification to the
identified section of the Standard Specification.

New: Item / specification is unique to this project and will not be found
in the Standard Specifications.

Replacement: A replacement of the entire identified section or subsection of
the Standard Specifications.

Modification: A replacement of the entire identified sentence or paragraph of
the Standard Specifications.

DIVISION 1
GENERAL REQUIREMENTS

1-01 DEFINITIONS AND TERMS

1-01.3 Definitions Supplement

Whenever reference is made in the Standard Specifications to the State
Department of Transportation, Secretary, Secretary of Transportation, State
Treasurer, Commission, or Washington Transportation Commission, such
reference shall be interpreted to mean the Port of Port Townsend (Owner)
acting through its manager and employees, or duly authorized
representatives, as applicable.

1-02 BID PROCEDURES AND CONDITIONS

1-02.12 Public Opening of Proposals Supplement

Date of Opening Bids
Bids are to be received at the Port of Port Townsend, PO Box 1180,
2701 Jefferson Street, Port Townsend, WA 98368 until 2:00 P.M. Wednesday
September 18, 2019.
1-05 CONTROL OF WORK

1-05.4 Conformity with and Deviations from Plans and Stakes Supplement

The Owner shall be responsible for setting all alignment stakes necessary for the construction of the breakwater repair.

1-07 LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

1-07.2 State Taxes Supplement

The work on this contract is to be performed upon lands whose ownership obligates the contractor to pay Sales tax. The provisions of Section 1-07.2(1) apply.

1-07.6 Permits and Licenses Supplement

The Contracting Agency is in the process of obtaining the below-listed permits for this project.

US Army Corps of Engineers, Section 404 and Section 10 permit
Washington Dept of Fish & Wildlife, Hydraulic Project Approval
Copies of the permits will be provided to the Contractor when available. Notice to Proceed will not be issued until permits are received and evaluated by Agency and Contractor. If permit stipulations affect the total project cost, a price adjustment will be allowed.

Hours of Work
Contractor work hours shall be limited to 7:00 am to 6:00 pm, Monday through Friday, except as approved by the Engineer. There shall be no work on legal holidays.

1-07.6 Permits and Licenses Supplement

Owners and Contractors Protective Insurance, per WSDOT Standard Specification 1-07.18.1, is not required for this project.

1-07.6 Temporary Water Pollution Prevention Supplement

All equipment that will operate over water will be cleaned of accumulated grease, oil, or mud. All leaks will be repaired prior to arriving on site. Equipment will be inspected daily for leaks, accumulations of grease, etc., and any identified problems will be fixed before operating over water.
Two oil absorbing floating booms, appropriate for the size of the work area, shall be available onsite whenever heavy equipment operates within 150 feet of open water and there is a potential for hazardous materials to enter surface waters. The booms will be stored in a location that facilitates immediate deployment in the event of a spill.

A written spill prevention, control, and countermeasures plan shall be prepared for activities that include the use of heavy equipment. The plan will describe measures to prevent or reduce impacts from accidental leaks or spills and will contain a description of all hazardous materials that will be used, proper storage and handling, and monitoring methods. A spill kit will be available onsite during construction and stored in a location that facilitates immediate deployment if needed.

1-08 PROSECUTION AND PROGRESS

1-08.5 Time for Completion Supplement

This project shall be physically completed within thirty (30) calendar days.

1-09 MEASUREMENT AND PAYMENT

1-09.1 Measurement of Quantities Supplement

Payment for all items of work required by this project shall be on a lump sum basis.

1-09.7 Mobilization Replacement

Mobilization, demobilization, and administration required for this work shall include, but is not necessarily limited to, the following items and work associated with any or all of the various schedules of the work when required by the Contract Documents: Bonds and Insurance, Mobilization, Pre-construction Conference, Permits and Licenses, Invoice Preparation, Administration Costs, Materials Testing, Construction Schedule, Temporary Facilities, Construction Meetings, Cleanup, Demobilization, and Record Drawings.
DIVISION 8
MISCELLANEOUS CONSTRUCTION

8-15  RIPRAP  New

Permeable ballast and quarry spalls may end dumped and spread uniformly. Rock fill and armoring shall be individually stacked and locked. 4 & 5 man rock shall be keyed at toe of slope. Place a minimum of two layers of 3, 4 & 5 man rock. Basalt rock, from the Jefferson County Shine or Penny Creek Quarries, is acceptable for this project.
DATUM REFERENCE:
BENCHMARK "R 257 1944"; EGOCH 1983-2001
="NAD83" 19.22 NAVD-88, SUPERCEDES 19.25 NAVD-88, NATIONAL GEODETIC SURVEY
="NAD83" 111.33 ABOVE MLLW OF MAP STATION 9444900, NOAA/NOS/CO-OPS
="NAD83" 15.79 NAVD29, FEMA FIRM COMMUNITY PANEL, # S50007000100

BREAKWATER SECTION
SCALE: 1" = 20' ± (H&M)

VICINITY MAP
SCALE: 1" = 1000'

REFERENCE:
APPLICANT: PORT OF PORT TOWNSEND
ADJACENT PROPERTY OWNERS
1. STATE OF WASHINGTON [WATERS OF]
2. PORT OF PORT TOWNSEND

LOCATION: PORT TOWNSEND BOAT HAVEN
APN: 65/4022.00
WASHINGTON STREET
PORT TOWNSEND, WA
LAT/LONG: 48.107004 N, 122.77592 W

PROPOSED PROJECT: BREAKWATER REPAIR
IN: PORT TOWNSEND BAY
NEAR/AT: PORT TOWNSEND
COUNTY: JEFFERSON
STATE: WASHINGTON

DATE: 4/01/19 REVISED 6/5/19 SHEET 1 OF 3
NOTES:
1. GEOTEXTILE SHALL BE NON-WOVEN, HIGH SURVIVABILITY PER WSDOT 9-33.2(1), TABLE 3, FOR SOIL STABILIZATION.
2. PERMEABLE BALLAST SHALL BE PER WSDOT 9-03.9(2), GRADATION FOLLOWS:
   - 3/4" = 100% PASSING
   - 2" = 65 TO 100%
   - 3/4" = 40 TO 80%
   - NO 4 = 3% MAX
3. QUARRY SPALLS SHALL BE PER WSDOT 9-13.5, GRADATION FOLLOWS:
   - 1.5" = 100% PASSING
   - 3" = 40% MAX PASSING
   - 3/4" = 10% MAX PASSING
4. ROCK FILL AND ARMORING SHALL BE PER WSDOT 9-13.7, APPROXIMATE WEIGHT AND SIZES FOLLOW:
   - 3 MAN ROCK = 700 TO 2000 POUNDS WITH AVERAGE DIMENSIONS OF 26" TO 36"
   - 4 & 5 MAN ROCK = 2000 TO 6000 POUNDS WITH AVERAGE DIMENSIONS OF 36" TO 54"
5. EXCAVATED SAND SHALL BE SPREAD ON TOP OF THE BREAKWATER WORK AREA, THE SAND SHALL BE MOUNDED ON THE 3 MAN ROCKS TO ACCOMMODATE EVENTUAL SETTLEMENT INTO THE ROCK Voids. (AN APPROXIMATE VOLUME OF 120 CY WILL REQUIRE AN AREA 30' WIDE X 225' LONG X 6' DEEP) ALL DISTURBED AREAS ON TOP OF THE BREAKWATER SHALL BE RE-VEGETATED WITH PLANTS SUITED TO THIS ENVIRONMENT UPON COMPLETION OF ALL OTHER WORK.

APPROXIMATE QUANTITIES:
- EXCAVATE & SPREAD SAND ...... 120-CY
- GEOTEXTILE .................. 620-SY
- PERMEABLE BALLAST ............ 64-TON
- QUARRY SPALLS ................. 225-TON
- 3 MAN ROCK .................. 480-TON
- 4 & 5 MAN ROCK ............... 735-TON

QUANTITY CALCULATING:
4 & 5 MAN SLOPE REPAIR: L = 280'
A = (25x3)/2 = 37.5, V = 10500 CF @ 140 Pcf = 735 TON
389 CY

TOP REPAIR 3 AREAS, L = 50, 100, 80
AVERAGE W = 14', L = 50+100+80 = 230
EXCAVATION V = (14x30)/27 = 120 CY
GEOTEXT = 8x230 + 8x230 + 8x6 = 5584 sf $5 600 SF $670 SY
6' PERM BALLAST = .5x230x8 = 920 CF = 64 T
6' ROCK FILL = 1x230x14 = 3220 CF = 225 CY
12' QUARRY SPALLS 1x230x8 + 1x230x8 = 3220 CF = 225 T
30' ROCK FILL = 1.5x230x14 = 6800 CF = 480 T
3 MAN ROCK = 735 CY

...